

ABSTRACT OF THE DISCLOSURE

A method of fabricating a trench isolation with high aspect ratio. The method comprises the steps of: providing a substrate with a trench; depositing a first
5 isolation layer filling the trench by low pressure chemical vapor deposition; etching the first isolation layer so that its surface is lowered to the opening of the trench; depositing a second isolation layer to fill the trench without voids by high density plasma chemical
10 vapor deposition and achieving global planarization by chemical-mechanical polishing then providing a rapidly annealing procedure. Accordingly, the present invention achieves void-free trench isolation with high aspect ratio.